

UNITED STATES DEPARTMENT OF AGRICULTURE  
Bureau of Agricultural Economics

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ELECTRICAL PROPERTIES OF COTTON

Some References to the Literature, 1931-date.

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References in this list were taken  
from Cotton Literature, volume 1, no.1  
to volume 9, no.10, inclusive, January  
1931 to October 1939.

Andô, Noboru, and Andô, Atusi. Studies on electrokinetic potentials.

I. Measurements of the electrokinetic potentials at the interfaces between fibers and water. Chem. Soc. Japan Jour. (Nippon Kwagaku Kwaishi) 55(10): 968-978. October 1934. 385 T57J

In Japanese.

"The electrokinetic potentials of cotton, silk, and wool were measured by the streaming-potential method. They were negative.-T.K." - Chem. Abs. 29(3): 660. Feb. 10, 1935.

Cater, A.E. Static electricity in rayon and other textile processes. Textile Manfr. 61(727): 277-278; (728): 313-314; (729): 361-362, 368. July-September 1935. 304.8 T3126

Also in Rayon and Melliand Textile Monthly 16(10): 611-612. October 1935.

The relation of static electricity generation to humidity and temperature conditions in cotton manufacture is mentioned.

Lottermoser, A., and Gansel, L. Elektroosmotische untersuchungen an baumwollzellulose und baumwollzelluloseestern und deren färbungen. Melliand Textilberichte 12(6): 407-410. June 1931. 304.8 T312

Electro-osmotic investigations of cotton cellulose, cellulose esters, and their dyeings.

"Electro-osmotic investigation indicates that raw, mercerized, bleached, and doubly-bleached cotton carries negative charges, the size of which decreases with the degree of bleaching. Cellulose acetate and benzoate

carry a much smaller negative charge, while the amino-benzoate is positively charged. The nature of the charge in mordanted cotton varies with the individual electrolytes. In the case of cotton, dyeing with Congo Red and Crystal Ponceau diminishes the charge considerably, while of the basic dyes, Methylene Blue decreases the charge, and Safranin and Chrysoidine increase it somewhat. The influence of dyestuffs on the nature of the charges in the various cellulose esters has also been investigated. The charge in cellulosic fibers appears to depend upon the number of secondary valencies, but theories other than the mutual effect of oppositely-charged colloids must be found to account for the alterations in the charge which result on dyeing." - *Melliand Textile Monthly* 3(10): 876. January 1932.

Meister, E. Ursachen und folgen der elektrostatischen aufladung von faserstoffen. *Melliand Textilberichte* 19(1): 21-26. January 1938. 304.8 T312  
Causes and removal of static charges on fibers.

"The occurrence of electrostatic charges on fibrous materials and their disturbing effects in textile processes are discussed, and various methods and devices for removing or neutralising the charges are briefly described. Experiments with combed sliver have shown that charges arise when the sliver is drawn out without contact with metal or other materials... A device for measuring charges on yarns on spinning frames is also described and the results of measurements on wool, cellulose acetate staple fibre, Cuprama, and mixture yarns on a worsted spinning machine and on Vistra CWW, Egyptian cotton, Zehlawa staple fibre, and Flox yarns on a cotton spinning machine at 50 per cent. R. H. and different spindle speeds are shown graphically and discussed... On the cotton ring spinning machine the Vistra CWW yarn acquired a considerably higher charge than the cotton and other yarns. The charge on the Flox yarn was lower than that on the cotton yarn and it has been found that smooth regular flox yarns can be obtained by spinning in a room at 50-55 per cent. R. H.-C." - *Textile Inst. Jour.* 29(4): A201-A202. April 1938.

Tsunokaye, R., and Enomoto, G. Electrical conductance of silk and other textile fibres. *Soc. Dyers and Colourists. Jour.* 49(12): 377-379. December 1933. 306.9 Scl

"The method of determining the electrical conductance of textile fibres is described. The electrical conductance of cellulose artificial silks is generally greater than that of natural silk, whilst that of cellulose acetate silk is much less than that of other artificial silks."

Walker, A.C. Effect of atmospheric humidity and temperature on the relation between moisture content and electrical conductivity of cotton. *Textile Inst. Jour.* 24(4): T145-T160. April 1933. 73.9 T31

Also in *Bell System Tech. Jour.* 12(4): 431-451. October 1933.

"The data to be given in this paper show the effect of successive equilibrium humidity cycles on the relation between (a) relative humidity and moisture content; (b) insulation resistance and relative humidity; and (c) insulation resistance and moisture content, for raw and water-boiled cotton at constant temperature (25° C.)"

Work in connection with the above paper was carried out in the Bell Telephone Laboratories, Inc., New York, N.Y.

Walker, A.C., and Quell, M.H. Influence of ash constituents on the electrical conduction of cotton. Textile Inst. Jour. 24(3): T123-T130. March 1933. 73.9 T31

"Evidence will be presented in this paper to show that the improvement in d.-c. insulation resistance of cotton, secured by washing, is accompanied by a reduction in the inorganic ash content from about 1% of the dry cotton weight to a value generally less than 0.3 per cent."

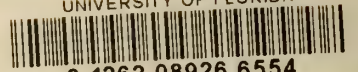
Cotton has been given primary consideration "since it is the most economical material available for use in telephone apparatus insulation, and the improvements in electrical properties secured by water washing have led to its substitution for silk to a large extent in the telephone industry."

Work in connection with the above paper was carried out in the Bell Telephone Laboratories, Inc., New York, N.Y.

#### ECONOMIC LIBRARY LISTS

- No. 1. State trade barriers; selected references. March 1939.
- No. 2. The frozen food industry; selected references, January 1937 to March 1939. April 1939.
- No. 3. High drafting in cotton spinning; selected references. April 1939.
- No. 4. Egg auctions; selected references. July 1939.
- No. 5. Acts administered by Agricultural Marketing Service. October 1939.
- No. 6. Periodicals relating to shipping. October 1939.
- No. 7. Electrical properties of cotton; some references to the literature, 1931-date. November 1939.

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